

# THE GROWERS

**F**armers have the most important job in the world. We must have food to live, and we depend on farmers to produce it.

Farming is hard, and it used to be a lot harder. A few hundred years ago, farmers had only hand tools, with horses or oxen pulling plows and harrows. Progress was slow.

It became a little easier in the 1700's when a horse-drawn cultivator and a seed drill were invented in England. A cultivator loosens the soil; a seed drill plants seeds.

More inventions in the past 200 years have brought remarkable changes to farming.

**ELI WHITNEY  
(1765-1825)**

Inventor of the cotton gin and a pioneer in developing mass production methods.

### ELI WHITNEY: CREATING KING COTTON

**T**he modern age of agriculture began in 1793 when Eli Whitney invented the cotton gin. The gin made it easy to remove seeds from raw cotton. It could do the work of 50 people. Cotton became the chief crop of the South. "King Cotton" ruled.

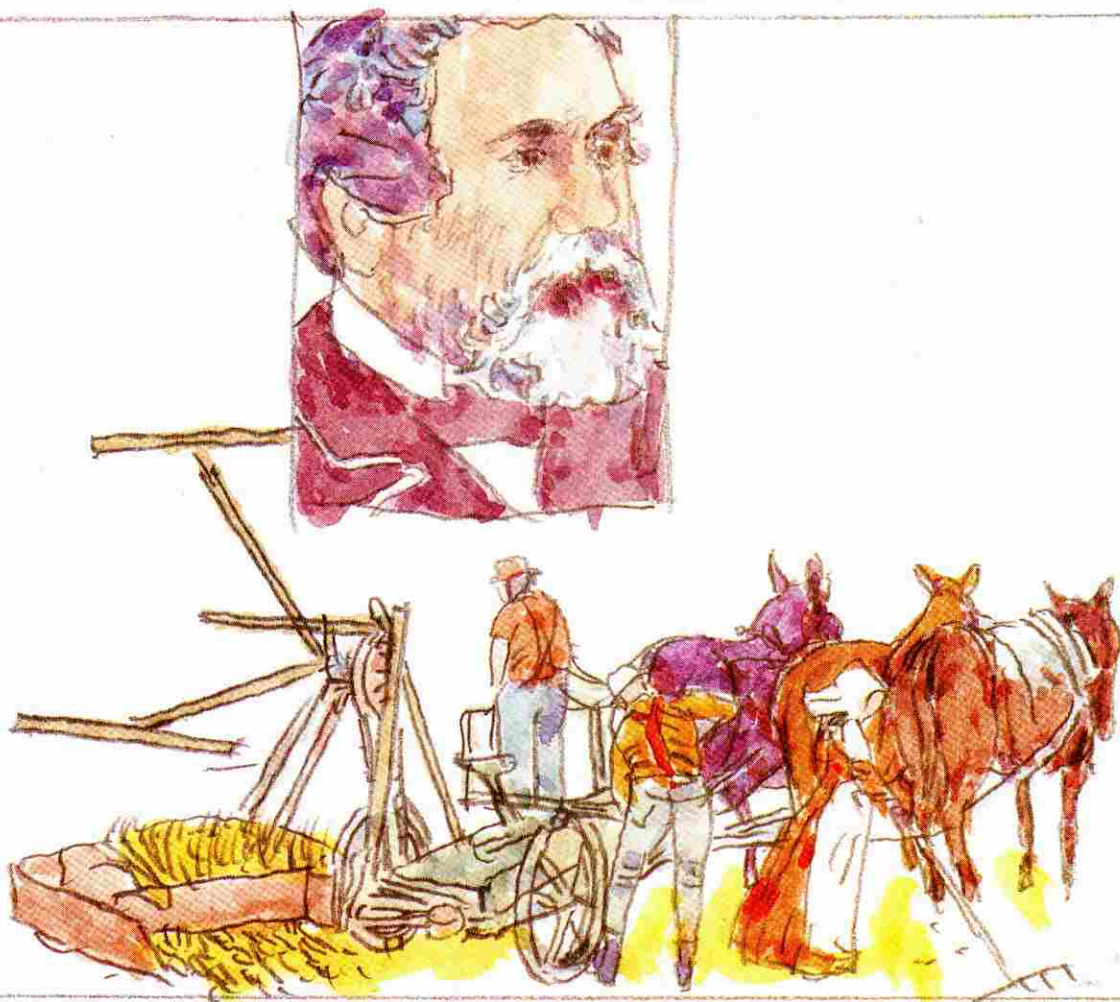
Eli Whitney was born in Massachusetts in 1765. He was slow at reading but good at math. He was also good at working with his hands. He made a violin at age 12 and took apart his father's watch to see how it worked. (And he put it back together.)

During the Revolutionary War, when Whitney was a teen-ager, he used the forge in his father's farm workshop to make nails and

Illustration by Marvin Friedman



## They Created Better Ways to Feed and Clothe Us.



farm tools. Later he went to Yale College and studied science.

Whitney went to Georgia after graduating from Yale in 1792. There he learned about the need for a device to take seeds out of cotton. In six months he had a working model of his cotton gin.

Whitney patented it in 1794, but people ignored his patent and copied his gin. He did not make much money from his invention. But he knew he had done well.

"I had the satisfaction to hear it declared by a number of men," Whitney said, "that my machine is the most perfect and most valuable invention that has ever appeared in this country."

Whitney built a factory for making muskets in Hamden, Conn., and invented several machine tools there. But because of his bad experience with the cotton gin patent, he never patented any of them.

Whitney pioneered mass production methods by making the parts of his guns interchangeable.

### CYRUS H. McCORMICK (1809-1884)

**Inventor of one of  
the first mechanical  
reapers;  
maker of farm  
machines.**

### CYRUS H. McCORMICK: THE REAPER MAN

Cyrus H. McCormick also fought patent battles. In 1831 he invented a reaper to make harvesting grain easier. Up to that time, farmers had cut grain by swinging long, heavy blades called cradles.

By the time McCormick applied for a patent in 1834, a mechanical reaper was already on the market. A former whaler from Maine named Obed Hussey invented it.

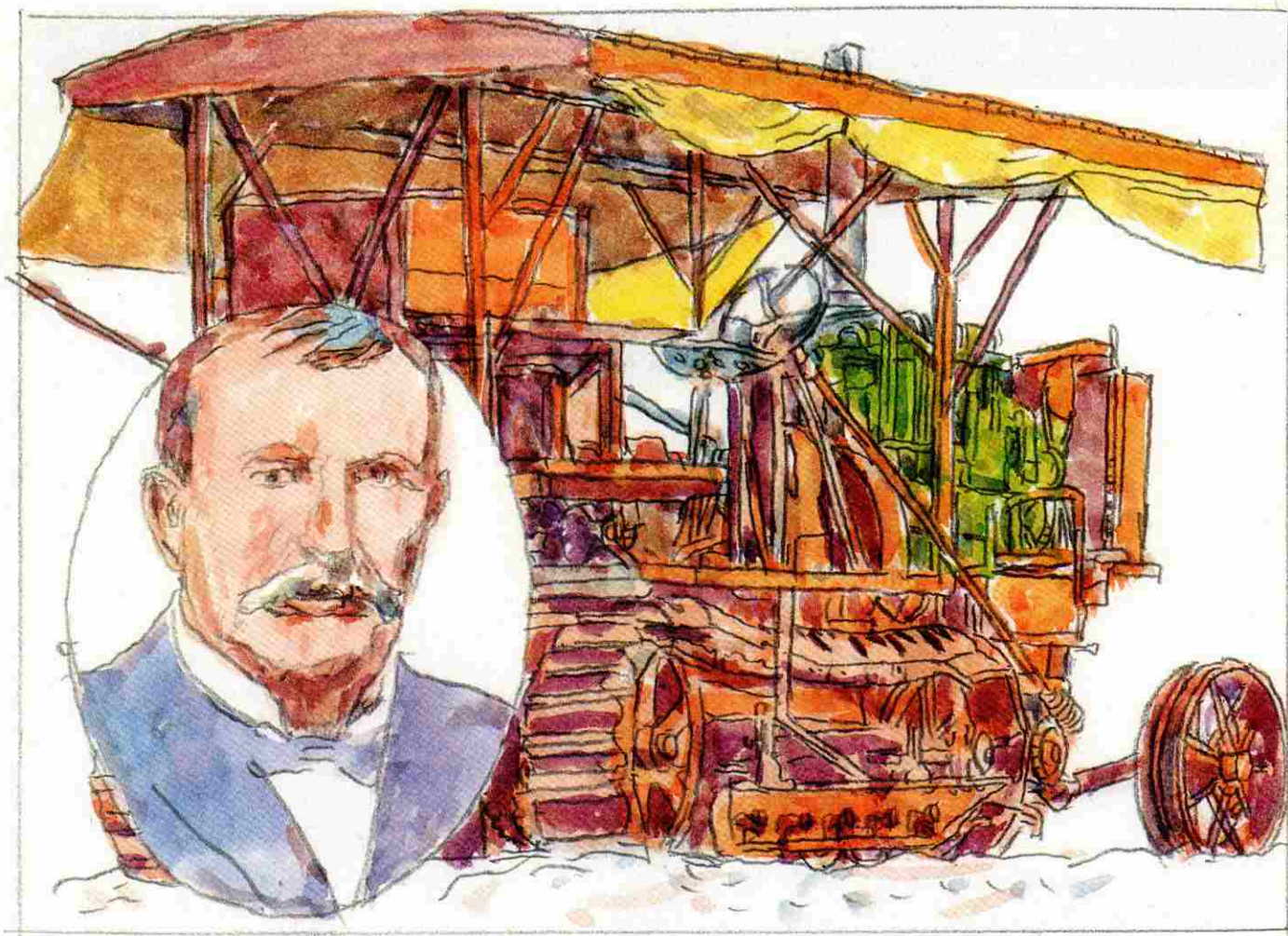
McCormick, Hussey and other inventors fought over reaper patents for many years. Eventually, McCormick adopted some of Hussey's ideas and became the biggest manufacturer of reapers.

McCormick was born in 1809 on a farm in western Virginia. His father was also an inventor of farm tools.

Cyrus was only 22 when he built his reaper. A reaper pulled by horses could harvest at least five acres of grain a day—five times as much as one man swinging a cradle.

The reaper helped to make America's Great





Plains one of the world's top wheat-producing areas.

### **BEN HOLT: MECHANICAL CATERPILLAR**

**D**uring the late 19th century, huge machines called combines were developed. They could both harvest grain and remove it from its husk. But the combines were so big it took 20 to 40 horses to pull them.

Farmers soon turned to mechanical "horses," or tractors. The first were steam-powered, like small train engines. The steamers took a long time to get up enough steam to start work, and they used a lot of fuel and water.

Gasoline-powered tractors solved these problems. The first was built in 1892, but it was noisy and broke down a lot. The first commercially successful gas-powered tractor was built in 1901 by Charles Hart and Charles Parr of Charles City, Iowa.

Because early tractors were heavy, they got stuck in soft soil. An inventor named Benjamin Holt solved that problem. He put treadmill wheels on a tractor to spread the weight over a bigger piece of ground. Ben Holt had already invented improvements to

**BENJAMIN  
HOLT  
(1849-1920)**  
Inventor of the  
first successful  
crawler-type  
tractor; farm  
machine  
manufacturer.

combines before working on tractors.

Holt was born and raised in Concord, N.H., where his father had a lumber mill. When he was a young man he joined his older brothers in California, where they were making carriages and farm machinery.

When Holt patented his tracked tractor in 1904, he called it a Caterpillar. Five years after Holt's death in 1920, his company and a competing company merged and took the Caterpillar name.

Caterpillars are used today mostly to move earth and clear land for construction projects.

### **WES JACKSON: A VISION FOR CHANGE**

**E**li Whitney, Cyrus McCormick, Ben Holt and hundreds of other inventors made it easier to till the soil and harvest crops.

But Wes Jackson, a biologist who studies agriculture, says: Whoa! Let's back up and start all over.

Jackson, who works at the Land Institute in Salina, Kan., says agriculture is in trouble. Soil erosion is about as bad now as it was 50 years ago. Pesticides and fertilizers pollute our soil and water. Irrigation of crops is dry-





ing up water sources. And, Jackson asks, what will happen when we run out of the oil needed to run farm machinery and the natural gas needed to make fertilizer?

Jackson, who grew up on a Kansas farm, thinks soil erosion could ruin agriculture. Erosion occurs because the soil must be tilled each year to grow annual crops, leaving it subject to the force of wind and rain.

Today's grain crops, such as corn and wheat, are annual plants. They must be planted each year. If the fields could be planted with perennial grains, which live through the winter, plowing would not be necessary for five years or more.

Jackson wants the U.S. Department of Agriculture to study perennial grains. "Another possibility is to try to domesticate wild species of grains that are already perennials," he says.

The results: Soil loss would be near zero. Use of oil-based pesticides and natural gas-based fertilizers would be much reduced. The need for irrigation would be less. And the need for oil and gas to run farm machinery would be way down.

Jackson's idea is to work with nature rather than against it. ♦ —**Robert W. Peterson**

**WES JACKSON**  
(Born 1936)  
Biologist and  
co-director of the  
Land Institute,  
which studies  
problems of  
agriculture.

## MORE BIG NAMES IN FARMING

- **Jethro Tull (1674-1741)**: Tull invented the first successful mechanical seed drill and horse-drawn row cultivator. Both tools revolutionized farming in England.

- **John Deere (1804-1886)**: In 1837, Deere invented a plow that greatly increased a farmer's production. It was made of steel and was more efficient than iron or wooden plows because heavy prairie soil didn't stick to it. The company he formed to make farm implements, Deere and Company, is now one of the largest agricultural equipment makers in the world.

- **George Washington Carver (About 1861-1943)**: Carver was born a slave but became one of America's most honored scientists. He found new uses for such crops as peanuts and sweet potatoes, forever changing agriculture in the South.

- **Norman Borlaug (Born 1914)**: Borlaug has helped feed millions of starving people with his work in developing strains of wheat. For his efforts, he won the Nobel Peace Prize, one of the world's highest honors, in 1970.

